

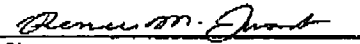
EXHIBIT A

MAR 23 2006



Western Digital Corporation
20511 Lake Forest Drive, E118-G
Lake Forest, California 92630

Tel: 949.672.7000
Fax: 949.672.6604

TO: COMMISSIONER FOR PATENTS, U.S. PATENT & TRADEMARK OFFICE		
FAX NO: (571) 273-8300 (GENERAL/MAIN FAX LINE)		
NO. OF PAGES: Cover + 11		
CERTIFICATE OF FACSIMILE TRANSMISSION I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office on the date indicated below. Renee M. Franks Typed/Printed Name  Signature March 23, 2006 Date	APPLICATION NO.	10/676,739
	FILING DATE	09/30/2003
	FIRST NAMED INVENTOR	William B. Boyle, et al.
	ART UNIT	2186
	CONFIRMATION NO.	7957
	EXAMINER	Paul W. Schlie
	ATTORNEY DOCKET NO.	K35A1281
TITLE	REDUCING MICRO-CONTROLLER ACCESS TIME TO DATA STORED IN A REMOTE MEMORY IN A DISK DRIVE CONTROL SYSTEM	

ATTACHED WITH THIS SUBMISSION:

1. Transmittal Form (1 page)
2. Response Under 37 C.F.R. § 1.111 to Office Action dated October 25, 2005 (10 pages)

PLEASE CONFIRM RECEIPT OF THIS TRANSMISSION. IF THERE IS ANY PROBLEM WITH THIS TRANSMISSION, PLEASE CALL RENEE M. FRANKS AT (949) 672-7871.

CONFIDENTIALITY NOTE

THE INFORMATION CONTAINED IN THIS FACSIMILE TRANSMISSION MAY BE LEGALLY PRIVILEGED AND IS CONFIDENTIAL INFORMATION INTENDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY NAMED ABOVE. IT IS EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW, INCLUDING COURT ORDERS, IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT OR THE EMPLOYEE OR AGENT RESPONSIBLE FOR DELIVERING THIS FACSIMILE TRANSMISSION TO THE INTENDED RECIPIENT. YOU ARE HEREBY NOTIFIED THAT ANY USE, DISSEMINATION, DISTRIBUTION OR COPY OF THIS FACSIMILE TRANSMISSION OR ITS INFORMATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS FACSIMILE TRANSMISSION IN ERROR, PLEASE IMMEDIATELY NOTIFY US BY TELEFAX OR TELEPHONE USING THE ABOVE NUMBERS AND AIRMAIL THIS FACSIMILE TRANSMISSION BACK TO US IMMEDIATELY. THANK YOU.

Y:\IP PROGRAM\K35A FILES\A1200-A1299\A1281\PTOA\1281_Faxcover USPTO_03.doc

MAR 23 2006

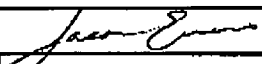
PTO/SB/21 (09-04)

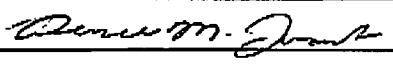
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/676,739
	Filing Date	09/30/2003
	First Named Inventor	William B. Boyle, et al.
	Art Unit	2186
	Examiner Name	Paul W. Schlie
	Attorney Docket Number	K35A1281
Total Number of Pages in This Submission		

ENCLOSURES (Check all that apply)		
<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT		
Firm Name	Western Digital	
Signature		
Printed name	Jason T. Evans, Esq.	
Date	March 23, 2006	Reg. No. 57,862

CERTIFICATE OF TRANSMISSION/MAILING		
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:		
Signature		
Typed or printed name	Renee M. Franks	Date March 23, 2006

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MAR 23 2006

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: William B. Boyle, et al.

Serial No.: 10/676,739

Filing Date: 09/30/2003

For: REDUCING MICRO-CONTROLLER
ACCESS TIME TO DATA STORED IN A
REMOTE MEMORY IN A DISK DRIVE
CONTROL SYSTEM

Art Unit: 2186

Examiner: Paul W. Schlie

Confirmation No.: 7957

Docket No.: K35A1281

REPLY UNDER 37 C.F.R. § 1.111
TO OFFICE ACTION DATED OCTOBER 25, 2005

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action mailed on October 25, 2005 for the above-identified patent application, please consider the following amendments and remarks. Please also note that the shortened statutory period was reset to run from January 3, 2006, based on a Decision Granting Applicant's Petition to Reset Period for Reply mailed on February 1, 2006.

Amendments to the **Claims** are reflected in the listing of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) In a disk drive control system comprising a micro-controller, a micro-controller cache system having a plurality of line-cache segments grouped into at least one line-cache segment-group, and a buffer manager communicating with the micro-controller cache system and a remote memory, a method for reducing the micro-controller access time to information stored in the remote memory via the buffer manager, the method comprising:

receiving in the micro-controller cache system a current data-request from the micro-controller; and

if the current requested data resides in a first line-cache segment of a first segment-group:

providing the current requested data to the micro-controller ~~if the current requested data resides in a first line-cache segment of a first segment-group;~~ and

automatically filling a second line-cache segment of the first segment-group with data retrieved from the remote memory wherein the retrieved data is sequential in the remote memory to the provided current requested data if the second line-cache segment hosted a most-recently requested data prior to the current requested data.

2. (Canceled)

3. (Currently Amended) The method of claim 2~~1~~, wherein the automatically filling further comprises:

filling the second line-cache segment if the current requested data is sequential to the most-recently requested data.

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

4. (Original) The method of claim 1, wherein the retrieved data comprises a burst of data in the range of 32 to 64 bytes.
5. (Original) The method of claim 1, wherein the plurality of line-cache segments are grouped into a plurality of line-cache segment-groups.
6. (Currently Amended) The method of claim 5, further comprising:
if the current requested data does not reside in the plurality of line-cache segment-groups:
 - selecting a line-cache segment-group ~~if the current requested data does not reside in the plurality of line-cache segment-groups;~~
 - filling a first line-cache segment of the selected line-cache segment-group with a first set of data from the remote memory location wherein the first set of data comprises the current requested data;
 - providing the current requested data to the micro-controller from the filled first line-cache segment; and
 - filling a second line-cache segment of the selected line-cache segment-group with a second set of data from the remote memory location wherein the second set of data is sequential in the remote memory to the first set of data.
7. (Original) The method of claim 6, wherein the selected line-cache segment-group is a least recently used line-cache segment-group.
8. (Original) The method of claim 6, wherein the first set of data comprises a first burst of data in the range of 32 to 64 bytes.
9. (Original) The method of claim 6, wherein the second set of data comprises a second burst of data in the range of 32 to 64 bytes.

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

10. (Original) The method of claim 1, wherein the line-cache segment-group comprises two line-cache segments.
11. (Original) The method of claim 1, wherein the remote memory comprises a dynamic random access memory (DRAM).
12. (Original) The method of claim 1, wherein the buffer manager is in communication with a plurality of control system clients and provides client-requested data to the clients from the remote memory.
13. (Original) The method of claim 12, wherein the plurality of control system clients comprises at least one of a disk subsystem, an error correction code subsystem, and a host interface subsystem.
14. (Currently Amended) A disk drive control system comprising:
a micro-controller,
a micro-controller cache system having a plurality of line-cache segments grouped into at least one line-cache segment-group, and
a buffer manager communicating with the micro-controller cache system and a remote memory, ~~the disk drive control system comprising:~~
wherein the micro-controller cache system is adapted to: a) receive a current data-request from the micro-controller, and, if the current requested data resides in a first line-cache segment of a first segment-group, b) provide the current requested data to the micro-controller if the current requested data resides in a first line-cache segment of a first segment-group, and c) automatically fill a second line-cache segment of the first segment-group with data retrieved from the remote memory wherein the retrieved data is sequential in the remote memory to the provided current requested data if the second line-cache segment hosted a most-recently requested data prior to the current requested data.

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

15. (Canceled)

16. (Currently Amended) The disk drive control system of claim 4514, wherein the micro-controller cache system automatically fills the second line-cache segment if the current requested data is sequential to the most-recently requested data.

17. (Original) The disk drive control system of claim 14, wherein the plurality of line-cache segments are grouped into a plurality of line-cache segment-groups.

18. (Currently Amended) The disk drive control system of claim 17, wherein the micro-controller cache system is further adapted to, if the current requested data does not reside in the plurality of line-cache segment-groups, a) select a line-cache segment-group ~~if the current requested data does not reside in the plurality of line-cache segment-groups~~; b) fill a first line-cache segment of the selected line-cache segment-group with a first set of data from the remote memory location wherein the first set of data comprises the current requested data; c) provide the current requested data to the micro-controller from the filled first line-cache segment; and d) fill a second line-cache segment of the selected line-cache segment-group with a second set of data from the remote memory location wherein the second set of data is sequential in the remote memory to the first set of data.

19. (Original) The disk drive control system of claim 18, wherein the selected line-cache segment-group is a least recently used line-cache segment-group.

20. (Canceled)

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

REMARKS

The Applicants thank the Examiner for his careful and thoughtful examination of the present application. By way of summary, Claims 1-20 were pending in this application. In the present amendment, the Applicants have canceled Claims 2, 15 and 20 without prejudice or disclaimer and amended Claims 1, 3, 6, 14, 16 and 18. Accordingly, Claims 1, 3-14 and 16-19 remain pending for consideration.

AMENDMENTS TO THE CLAIMS

Claim 1 has been amended to clarify the claim language, and to incorporate limitations from previously pending Claim 2. Claim 3 has been amended to depend properly from Claim 1. Claim 6 has been amended to clarify the claim language. Claim 14 has been amended to clarify the claim language, and to incorporate limitations from previously pending Claim 15. Claim 16 has been amended to depend properly from Claim 14. Claim 18 has been amended to clarify the claim language. The amendments to these claims have not been made for the purposes of patentability, and it is believed that the claims would satisfy the statutory requirements for patentability without the entry of such amendments

REJECTION UNDER 35 USC § 102(b)

The Office action rejected Claims 1-2, 4-15 and 17-19 under 35 U.S.C. § 102(b) as being anticipated by U.S. patent no. 6,360,299, issued to Arimilli *et al.* (the Arimilli patent). The Applicants respectfully traverse this rejection because the Arimilli patent fails to identically teach every element of the claims. See M.P.E.P. § 2131 (stating that in order to anticipate a claim, a prior art reference must identically teach every element of the claim).

In particular, amended Claim 1 recites a method for reducing micro-controller access time, comprising: "if the current requested data resides in a first line-cache segment of a first segment-group: providing the current requested data to the micro-controller; and automatically filling a second line-cache segment of the first segment-

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

group with data retrieved from the remote memory wherein the retrieved data is sequential in the remote memory to the provided current requested data if the second line-cache segment hosted a most-recently requested data prior to the current requested data." These limitations of Claim 1 are not taught or suggested by Arimilli.

The Examiner asserts that Arimilli teaches to "automatically fill a subsequent second segment . . . which was most recently previously accessed relative to the most current request with corresponding sequentially accessed data (column 10 lines 27-28)." Office action, page 2. The Applicants respectfully disagree.

The Applicants submit that column 10, lines 27-31 recites: "[a]n additional bit 229 may optionally be utilized to indicate as between the two slots, which is the most recently used, for those cases wherein a prefetch request misses the L2 cache and both slots already have prefetched lines with different stream IDs." However, this passage does not teach the step of "automatically filling a second line-cache segment . . . if the second line-cache segment hosted a most-recently requested data," as recited by the amended claim.

Instead, Arimilli's method of selecting a next "victim" line for filling uses "a standard victim selection algorithm, such as a least-recently, or less-recently, used (LRU) algorithm, which is applied to all sets including the prefetched line." Col. 9, ll. 55-58. Thus, according to Arimilli's method, the line that has been least-recently used is used to receive new data. For example, Arimilli describes that "[w]hen a prefetch request misses the L2 cache and neither slot is allocated, a victim is selected using the standard LRU algorithm" (Col. 10, ll. 4-6), and "[t]he prefetch slots are not exclusively used for speculative requests; they may be used for non-prefetch requests if the standard LRU algorithm were to select[] that set for victimization" (Col. 10, ll. 11-14). Arimilli does not disclose any other algorithm for selecting the next line for victimization. Therefore, Arimilli does not disclose "automatically filling a second line-cache segment . . . if the second line-cache segment hosted a most-recently requested data." Instead, the additional bit 229 called out by the Examiner would likely be used to protect a slot, by preventing the most recently used slot from being victimized. Indeed, there is no

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

disclosure or suggestion anywhere in Arimilli of automatically filling a line-cache segment if the most recently used bit 229 is set for that line-cache segment.

For at least these reasons, Applicants respectfully submit that the rejection of amended Claim 1 over Arimilli is improper, and the Applicants respectfully request allowance of Claim 1.

Claims 4-13, which depend from Claim 1, are believed to be patentable for at least the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

Amended Claim 14 similarly recites a disk drive control system comprising a micro-controller cache system adapted to: "if the current requested data resides in a first line-cache segment of a first segment-group . . . automatically fill a second line-cache segment of the first segment-group with data retrieved from the remote memory wherein the retrieved data is sequential in the remote memory to the provided current requested data if the second line-cache segment hosted a most-recently requested data prior to the current requested data." These limitations of Claim 14 are not taught or suggested by Arimilli.

As discussed above, Arimilli does not teach a micro-controller cache system adapted to "automatically fill a second line-cache segment . . . if the second line-cache segment hosted a most-recently requested data," as recited by the claim. Therefore, for reasons similar to those discussed above, Applicants respectfully submit that the rejection of amended Claim 14 over Arimilli is improper, and the Applicants respectfully request allowance of Claim 14.

Claims 17-19, which depend from Claim 14, are believed to be patentable for at least the same reasons articulated above with respect to Claim 14, and because of the additional features recited therein.

REJECTION UNDER 35 USC § 103(a)

The Office action further rejected Claims 3 and 16 under 35 U.S.C. § 103(a) as being unpatentable over the Arimilli patent in view of U.S. patent no. 5,345,560, issued to Miura *et al.* (the Miura patent). The Applicants respectfully traverse this rejection

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

because the Arimilli patent, alone or in combination with the Miura patent, fails to teach or suggest the elements of the claims. See M.P.E.P. § 2143 (stating that in order to establish a *prima facie* case of obviousness for a claim, the prior art references must teach or suggest all the claim limitations).

In particular, the Miura patent does not cure the deficiencies of the Arimilli patent discussed at length above with respect to Claims 1 and 14. Therefore, for reasons similar to those discussed above, Applicants respectfully submit that amended Claims 1 and 14 are not obvious in view of the Arimilli and Miura patents.

Claims 3 and 16, which depend from Claims 1 and 14 respectively, are believed to be patentable for at least the same reasons articulated above with respect to Claims 1 and 14, and because of the additional features recited therein.

Art Unit 2186
Serial No. 10/676,739

Reply to Office Action of: October 25, 2005
Attorney Docket No.: K35A1281

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that the pending claims are now in condition for allowance and request reconsideration of the rejections. If it is believed that a telephone conversation would expedite the prosecution of the present application, or clarify matters with regard to its allowance, the Examiner is invited to contact the undersigned attorney at the number listed below.

No fee is believed to be due. However, the Commissioner is hereby authorized to charge payment of any required fees associated with this Communication or credit any overpayment to Deposit Account No. 23-1209.

Respectfully submitted,

Date: March 23, 2006

By: 

Jason T. Evans, Esq.
Reg. No. 57,862

WESTERN DIGITAL TECHNOLOGIES, INC.
20511 Lake Forest Drive
Lake Forest, CA 92630
Tel.: (949) 672-7000
Fax: (949) 672-6604